EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Michael Carter on 2/11/09.

The application has been amended as follows:

1. A method for controlling presentation of information to facilitate performance analysis for processing, the method comprising:

capturing a list of events directed at composing a video frame during processing of a set of commands by a graphics processing unit, a subset of the events comprising commands sent to the graphics processing unit ~~from a memory location~~ and associated data from a memory location referenced by the command;

capturing the state of the graphics processing unit for each of the captured events;

displaying a listing of the captured events as well as information regarding the processing of the events;

displaying a window including a video frame portion that displays a rendering of the video frame; receiving a user selection of one of the events of the listing;

modifying the selected event;

setting the state of the graphics processing unit to the captured state associated with the selected event;

executing the selected event in the graphics processing unit; and displaying in the video frame portion a visual representation of the frame resulting from the execution of the selected event;

identifying a pixel shader program or vertex shader program that was included in a graphics processing unit and was executed by the graphics processing unit in drawing the frame, and further modifies the pixel shader program or the vertex shader program to identify input and output register values for each instruction in the shader program as it executed in drawing the selected pixel.

8. (Canceled)

9. One or more computer readable storage media having one or more instructions that, when executed by one or more processors, causes the one or more processors to:

capture a list of events directed at composing a video frame during processing of a set of commands by a graphics processing unit a subset of the events comprising commands sent to the graphics processing unit and associated data from a memory location referenced by the command;

capture the state of the graphics processing unit for each of the captured events, the state comprising transitory states of internal variables of the graphics processing unit;

display a first window that identifies the list of events that have been captured during the drawing of the video frame;

receive a user selection of one of the events in the list;

modify the selected event;

set the state of the graphics processing unit to the captured stated associated with the selected event;

execute the selected event in the graphics processing unit; and

display a second window including a video frame portion that shows how the frame appears at different points while being drawn;

identify a pixel shader program or vertex shader program that was included in a graphics processing unit and was executed by the graphics processing unit in drawing the frame, and further modifies the pixel shader program or the vertex shader program to identify input and output register values for each instruction in the shader program as it executed in drawing the selected pixel.

18. A system comprising:

a memory;

a processor coupled to the memory; and

a plurality of instructions stored in the memory and executed by the processor to present a user interface to enable a user to view information regarding a frame of video, the user interface comprising:

a list of events including events captured during composition of a video frame by a graphics processing unit, wherein each captured event represents a command submitted to the graphics processing unit, a subset of the events comprising commands sent to the graphics processing unit ~~from a memory location~~ and obtaining data from a memory location referenced by the command;;

an events window that identifies the events captured during the composition of the video frame;

a frame window that shows how the video frame appeared immediately after a particular event was finished being drawn;

a debugger portion that identifies a pixel shader program or vertex shader program that was included in a graphics processing unit and was executed by the graphics processing unit in drawing the frame, and further modifies the pixel shader program or the vertex shader program to identify input and output register values for each instruction in the shader program as it executed in drawing the selected pixel.

21. (Canceled)

24. (Canceled)

The following is an examiner's statement of reasons for allowance:

The closest prior art (US 6,047,123 to Brown et al.; "Introduction to the Performance Analyzer for PlayStation2" by Bender et al.) teaches capturing a list of events and associated data sent to the graphics processing unit (e.g. Brown col. 2, lines 16-20 "recording source code instructions corresponding to at least selected calls issued during such execution, and recording at least selected data referred to in those calls"); capturing the state of the graphics processing unit (e.g. Brown col. 2, lines 56-61 "identifying … and reporting one or more of those composite graphical states"); displaying a listing of the captured events (e.g. Brown col. 5, lines 7-14 "records corresponding source code statements in source file 40"); displaying a rendering of the video frame (e.g. Brown col. 5, lines 39-42 "an intercepted call refers to a graphical window in which drawings are to be rendered"); modifying a selected event; executing the selected event in the graphics processing unit; and displaying in the video frame portion a visual representation of the frame resulting from the execution of the selected event (e.g. Brown col. 9, lines 10-18 "permits the programmer to test ... the applications program ... For example if the applications program 32 normally runs unexpectedly slowly or crashes, execution of the compliable trace … will help the programmer isolate the cause").

The closest prior art does not teach identifying a pixel shader program or vertex shader program that was included in a graphics processing unit and was executed by the graphics processing unit in drawing the frame, and further modifies the pixel shader

program or the vertex shader program to identify input and output register values for each instruction in the shader program as it executed in drawing the selected pixel.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Mitchell whose telephone number is (571)272-3728. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bullock Lewis can be reached on (571) 272-3759. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jason Mitchell/
Examiner, Art Unit 2193

/Lewis A. Bullock, Jr./
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